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Docket: AM-1622.D1

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Date: 10 July 2001 Ingrid C. Mallory
Ingrid C. Mallory

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Hong SHIH et al.

Attorneys Docket: AM-1622.D1

Serial No.: 09/489,356

Art Unit No.: 1763

Filed: January 21, 2000

Examiner: R. Zervigon

For: "COATING BORON CARBIDE ON ALUMINUM"

Commissioner of Patents and Trademarks
Washington, DC 20231

REQUEST FOR RECONSIDERATION UNDER 37 CFR §1.111

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Sir:

In response to the Office Action of May 11, 2001, the Examiner is requested to reconsider his rejection and allow all claims.

REMARKS

Claims 1-6 and 8-23 remain in the application.

The Examiner has rejected Claims 1-6 and 8-22 under 35 U.S.C. §103(a) as being obvious over Linke, Mizuhara, Ponnekanti, Reinhard, Raeder and Smithells. This rejection is traversed. The Examiner has not provided a detailed rejection for Claim 23.

This rejection has been adequately addressed in the prior response to the same rejection over the same art. The arguments presented there are reiterated but will not be repeated. This response will address only errors presented in the Examiner's comments as well as a general basis for patentability.

The Examiner refers to Mizuhara's UNS S41000 as a substrate including at least 90 wt% elemental aluminum. TABLE 1 of Mizuhara does list this alloy, but it provides no composition except that it is a 410 stainless steel. It is well known that stainless steel does not comprise 90% elemental aluminum, instead having a very high fraction of iron and substantial fractions of refractory metals. Aluminum is not a well known alloying element for stainless steel. Smithell's TABLE 34 lists the compositions of several materials. It is believed, however, that the compositions on pages 1000 and 1001 of Smithell are not steels but nickel alloys. In any case, the highest aluminum content that is listed is 1.6%, far less than the claimed lower limit of 90%. The Examiner also states that Inconel is an aluminum-based material. The undersigned attorney could not find a composition for Inconel, but it is very doubtful that it contains 90% elemental aluminum based upon its melting point of 1400°C compared to 660°C for aluminum.

Contrary to the Examiner's statement, Mizuhara does not teach roughening pure aluminum. He does not teach pure aluminum. He does not teach roughening. Indeed, his TABLE 3 suggests that he never roughens but only polishes, though to little effect on the peel strength.

The Examiner states that it would be obvious to "roughen a surface ... to increase the roughness from the 1.17µm [of Mizuhara] to at least 2.5µm." On the contrary, Mizuhara teaches that "Table 3 also shows that surface roughness does not affect peel strength." (page 005, third column) so that Mizuhara teaches against any further roughening. The Examiner's reference to Reinhart is counterproductive to his argument. Reinhart is concerned with adhesives for bonding together flight hardware, particularly of orthotropic materials (such as advanced composites). Reinhart is not concerned with coatings of boron carbide. Aluminum is certainly not a composite material of the sort that Reinhart is interested in. Raeder is concerned with polishing glass and

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glass-ceramics, not roughening aluminum prior to deposition of another material. "The purpose of the polishing operation is to bring the workpiece surface finish within tolerance and produce a transparent part or highly reflective surface." (page 468, third column) Thus, Raeder is irrelevant to forming boron carbide on an aluminum substrate.

The Examiner refers repeatedly to ceramics. The relevance of ceramics to aluminum and boron carbide is not clear. The ceramics of Mizuhara are alumina, mullite, and beryllia. Neither aluminum nor boron carbide is suggested in the applied references to behave like the listed ceramics.

The art thus fails to teach the combination of a boron carbide coating and an aluminum-based substrate and further fails to teach the combination of a boron carbide coating and an anodized aluminum substrate. The art has even failed to suggest the advantage of roughening the aluminum prior to anodization. It is not disputed that some art teaches boron carbide coatings and that other art teaches aluminum members, perhaps anodized. It is, however, disputed that the combination of aluminum and boron carbide is in any way suggested in the art. The test for obviousness is not that the prior art can be combined but that there is a suggestion in the prior art for making the combination.

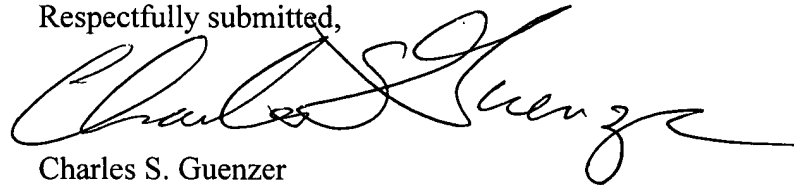
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In view of the above remarks, reconsideration and allowance of all claims are respectfully requested. If the Examiner believes that a telephone interview would be helpful, he is invited to contact the undersigned attorney at the listed telephone number, which is on California time.

Date: 10 July 2001

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Respectfully submitted,



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